

What is Claimed is:

1. A method for isolating nanobubbles or nanocapsules from a mixed population microbubbles and nanobubbles or microcapsules and nanocapsules comprising  
5 separating nanobubbles or nanocapsules from the mixed population into a lower layer or regions and collecting the lower layer or region containing the nanobubbles or nanocapsules.

2. A method for producing surfactant-stabilized  
10 microcapsules or nanocapsules comprising:

(a) preparing a suspension comprising a non-ionic sorbitan detergent and a salt in phosphate buffered saline;

(b) adding to the suspension a nonionic polyoxyethylenesorbitan detergent to produce a solution;

15 (c) heating while stirring the solution of step (b) to  $55 \pm 5^\circ\text{C}$  and maintaining the temperature of the solution at  $55 \pm 5^\circ\text{C}$  for several minutes;

(d) allowing the solution to cool to room temperature;

(e) autoclaving the solution;

20 (f) creating surfactant-stabilized microbubbles and nanobubbles in the solution; and

(g) collecting surfactant-stabilized nanocapsules and microcapsules formed from the microbubbles and nanobubbles.

3. The method of claim 2 further comprising  
25 separating the surfactant-stabilized nanocapsules from the surfactant-stabilized microcapsules into a lower layer or region as compared to the surfactant-stabilized microcapsules and collecting the lower layer or region of isolated nanocapsules.

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4. A microcapsule or nanocapsule produced in accordance with the method of claim 1, 2 or 3.

5. A contrast agent for diagnostic imaging in a patient comprising microcapsules or nanocapsules of claim 4 filled with a gas.

6. The contrast agent of claim 5 further comprising  
5 a targeting agent attached to an outer surface of the microcapsules or nanocapsules.

7. A method for imaging a tissue or tissues in a subject comprising administering to the subject the contrast agent of claim 5.

10 8. A method for selectively imaging a tissue or tissues in a subject comprising administering to the subject the contrast agent of claim 6.

9. The method of claim 8 wherein the contrast agent selectively targets diseased tissue and distinguishes the  
15 diseased tissue from normal tissue.

10. The method of claim 8 wherein the contrast agent selectively targets malignant tissue and distinguishes the malignant tissue from benign tissue.

11. A composition for delivery of a bioactive agent  
20 comprising a microcapsule or nanocapsule of claim 4 and a bioactive agent adsorbed to, attached to, encapsulated in, or any combination thereof, the microcapsule or nanocapsule.

12. The composition of claim 11 further comprising a  
25 targeting agent attached to an outer surface of the microcapsule or nanocapsule.

13. A method for delivering a bioactive agent to a

subject comprising administering to the subject the composition of claim 11 and triggering release of the bioactive agent in the subject by administration of an energy source.

5           14.    A method for delivering a bioactive agent to a subject comprising administering to the subject the composition of claim 11 wherein bioactive agent is released by degradation of the surfactant-stabilized microcapsule or nanocapsule.

10           15.    The method of claim 14 wherein degradation of the surfactant-stabilized microcapsule or nanocapsule and release of the bioactive agent is altered by ultrasound or heat.

              16.    A method for targeting a bioactive agent to a  
15 selected tissue in a subject comprising administering to the subject the composition of claim 12.

              17.    The method of claim 16 wherein the composition is targeted to diseased tissue.

              18.    The method of claim 16 wherein the composition is  
20 targeted to malignant tissue.

              19.    A method for enhancing delivery of a nanocapsule to a selected tissue via holes in vasculature too narrow for access via larger microcapsules comprising administering a nanocapsule to a subject and exposing the  
25 subject to ultrasonic waves which force the nanocapsule through the holes in the vasculature.

              20.    A method for enhancing delivery of a nanocapsule to a selected tissue via holes in of the vasculature too

narrow for access via larger microcapsules comprising administering a nanocapsule of claim 4 to a subject and exposing the subject to ultrasonic waves which force the nanocapsule through the holes in the vasculature.